

IAP20 Rec'd PCT/PTO 23 JAN 2006

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) : Friedrich BOECKING  
Based on : PCT/DE 2004/001197  
Title : FUEL INJECTION DEVICE  
Docket No. : R.305747  
Customer No. : 02119

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97(b),  
AND EXPLANATION OF THE RELEVANCE OF THE CITED PRIOR ART**

Sir:

The undersigned hereby requests that the prior art cited on the attached prior art statement be placed of record in the application file and be considered by the examiner.

This citation of prior art is made under 37 CFR 1.97(b), since it is being filed before the mailing of the first Office Action.

The relevance of the prior art cited on the attached form PTO/SB/08a is as follows:

**DE 197 32 802 A1**

The invention concerns a fuel injection device for internal combustion engines, wherein the displacement of a member closing the fuel injection valve is controlled by pressure prevailing in a control chamber. The pressure prevailing in said chamber is further controlled by a pilot valve whereof the closure member can be actuated by a piezoelectric drive, the movement being transmitted via a hydraulic chamber. Said closure member comprises two sealing surfaces which co-operate with valve seats, and when it passes from one valve seat to the other, a brief discharge occurs in the control chamber, to control a brief fuel injection. In order to obtain larger amounts of injected fuel, the pilot valve can be put in open or closed position.

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DE 101 18 053 A1

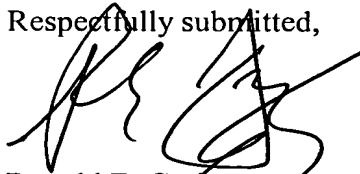
This patent relates to a device having an especially piezoelectric actuator unit for operating a valve element with at least one control piston and at least one actuation piston that operates a valve closure element that interacts with at least one valve seat and separates a control bore from an outlet chamber in the closed position. A hydraulic chamber between the pistons transfers movement of the control piston to the actuating piston, which is essentially in hydraulic force equilibrium with the valve element closed.

JP 11-193763

This invention shows that to make the injection rate variable in one fuel injection cycle by freely controlling the lift of the needle of the fuel injection valve of an internal combustion engine. A needle having a differential pressure boundary plate that separates into upper portion and lower portion of a differential pressure chamber that communicates with two accumulators moves up and down to compensate each change in the capacity between those accumulators of the upper and lower portions of the piston caused by the movement thereof along with sliding movement of the electrostrictive actuator. The voltage applied to the electrostrictive actuator is gradually controlled such that the lift of the needle can be freely changed.

Examination of this application is respectfully requested.

Respectfully submitted,



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Enclosure

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